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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,181	07/15/2003	Kouji Takahashi	Q76587	4972
23373 7590 02/13/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER LAZORCIK, JASON L	
			ART UNIT 1791	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/619,181	Applicant(s) TAKAHASHI ET AL.	
	Examiner Jason L. Lazorcik	Art Unit 1791	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 November 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 7,8,12-17 and 20-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7, 8, 12-17, 20-24, and 25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 7, 2007 has been entered.

### ***Information Disclosure Statement***

The information disclosure statement filed October 11, 2007 fails to comply with 37 CFR 1.98(a)(1), which requires the following: (1) a list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a column that provides a blank space next to each document to be considered, for the examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement. The information disclosure statement has been placed in the application file, but the information referred to therein has not been considered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 7, 8, 12-17, and 20-25** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitation "the main surface" in lines 5, 9, and 12. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "the main surface" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Additionally, Applicant has provided a new limitation in both independent claims 7 and 12 which requires in part that "the etching step (is) executed so that a load is restrained in the precision polishing step and a resultant amount of a turned-down edge of the glass substrate falls within a range between 2 micrometers and 0 micrometers after the precision polishing step". Applicant has provided substantially no nexus linking the etching operation, the applied "load" in the precision polishing step, and the degree of the "turned-down edge" such that one of ordinary skill in the art would reasonably be apprised of the particular metes and bounds of the claimed invention.

Claims 20 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, each of the claims 20 and 21 recite the limitation wherein the polishing step is performed to provide the glass substrate with a "flatness required for a selected one of ArF excimer laser, F2 excimer laser, and EUV". Since applicant has failed to adequately define the requisite flatness and one of ordinary skill would not necessarily be apprised of said flatness, the particular metes and bounds for which applicant seeks patent protection are rendered unclear and indefinite.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims **7, 8, 12-17, 20-24, and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker (US 2,372,536) in view of Feng (US 6,596,042 B1) and Hagihara (US 2001/0051746 A1).

**(I). Walker (US 2,372,536):**

Walker teaches an improved method for preparing precision polished glass surfaces. The reference teaches that the method is applicable to the formation of highly polished optical lens, prisms, flats or other like glass objects which, in the absence of evidence to the contrary, are understood to display a "flatness" sufficient for use with one of the claimed source lasers or EUV [**Claims 20, 21**].

In accordance with the Walker disclosure and with particular regard to **Claims 7 and 13**, a glass substrate is first subjected to a rough grinding process. The reference teaches that after the rough grinding "it is extremely difficult to properly inspect a stock piece for the presence of relatively deep scratches or marrings or internal inclusions or striae or other imperfections" (pg 2, Column 2, Lines 46-74).

The inventors then subject the substrate to immersion in a reactive chemical agent or etching solution which removes the surface debris and rounds off the edges of the workpiece. Walker discloses that after the etching treatment, "any relatively deep surface scratches or other mars will now be readily discernible". Since this chemical etching reaction acts upon "all surface portions", the solution is understood to provide an isotropic etch of the substrate [**Claim 23**]. It is therefore understood that surface defects are "elicited" through etching process which visually magnifies the surface defect during an inspection of the surface.

The thus etched substrate is further subject to a fine polishing or precision polishing (Page 3, Column 2, Lines 45-46). After said precision polishing, the substrate

is optionally subjected to a final dip or “cleaning step” in an etchant solution or chemical debris-clearing solution (Page5, Lines 17-38) [**Claim 8, 13**]

Walker teaches that etch rate of the etchant or cleaning solutions may be controlled by tailoring the ratio of solution constituent hydrofluoric and sulfuric acids, the substrate immersion time, and the bath temperature (Page 3, Column 1, line 44 through Column 2, line 26). The Walker reference is silent regarding a particular limitation upon the amount of material removed from either the etching step or the final cleaning step as set forth in Claims 15 and 17, respectively, or upon the etch rate of the etching step as per claims 24 and 25. Walker further is silent on the nature of the abrasive utilized in the polishing procedures as required in claim 22 or upon the root mean square roughness of the in final optical element as per claim 14.

With respect to **Claims 15** and newly submitted **Claims 24 and 25**, it would have been well within the purview of one of ordinary skill in the art at the time of the invention to provide a cleaning step etch of between 0 to 10nm depth [**Claim 15**] and to likewise control the etch rate to within the claimed ranges of between 0.2nm/min and 2 nm/min [**Claims 24 and 25**]. Restated, Walker teaches that the factors affecting etch rate and etch depth, such as etchant concentration, immersion time, and bath temperature, are subject to routine experimentation and optimization. It follows, absent any evidence showing substantially unexpected results, that one of ordinary skill in the art at the time

of the invention would have arrived at the claimed etch rates and/or etch depths through no more than routine optimization of the disclosed process.

**(II.) Feng (US 6,596,042 B1):**

Next, the reference to Feng (US 6,596,042 B1) teaches common techniques, materials, and tolerances considered to be known to skilled practitioners in the field of precision polishing or Chemical-Mechanical polishing (CMP). First, the reference teaches that known slurry formulations comprising silica or ceric oxide are have been developed with ceric oxide being recognized as the most efficient abrasive towards silicon dioxide (e.g. glass) (Column 1, lines 23-33). The reference in Example 4 (Column 5, lines 3-33) further teaches that RMS roughness values of less than 1 angstrom and silica removal rates of less than 85 angstroms/minute are achievable by precision polishing with slurries of silica and/or cerium oxide.

In light of the Feng disclosure and absent any compelling or unexpected results to the contrary, it is the Examiners position that precision polishing operations which use colloidal silica and/or cerium oxide abrasive particles [**Claim 22**] and which remove between 10 and 200nm of silica [**Claim 17**] to yield a surface RMS value of 0.2nm [**Claim 14**] are well within the prevue of one of ordinary skill in the art.

**(III.) Hagihara (US 2001/0051746 A1)**

The reference to Hagihara relates a method for pecision polishing a substrate which provides a minimum "roll-off" (edge rounding of end sides of the substrate) in the



polishing process. It is understood by the Examiner that the process termed as "roll-off" in the instant reference is essentially equivalent to applicants claimed "amount of a turned-down edge" of a substrate.

Hagihara discloses that reducing roll-off in glass hard drive substrates is a recognized goal in glass hard drive substrate manufacturing since decreasing roll-off increases data recording area and subsequently leads to higher hard drive capacities. The reference explicitly teaches that various methods are known which can reduce this roll-off effect, "such as making a polishing pad more rigid, and making a polishing load smaller (Page 1, ¶[0004]). The reference continues by disclosing a particular polishing agent which results in a roll off value of "0.2 mm/mm or less, more preferably 0.15mm/mm or less, still more preferably 0.10 mm/mm or less". It follows from the Hagihara disclosure that the claimed "turned-down edge" tolerances would be recognized as conventional by one of ordinary skill in the art at the time of the invention. Said claimed ranges would have been achieved through no more than routine experimentation and optimization by a skilled artisan seeking to fabricate a precision polished HD substrate according to the Walker method.

In summary, the cited prior art references to Walker, Feng, and Hagihara all relate to fabrication of highly planar and defect free glass substrates such as may be found for example in the glass hard drive substrate manufacturing arts.

Walker teaches essentially every element of applicants claimed method including the steps of 1) rough polishing a main surface of a glass substrate, 2) eliciting defects or

cracks in the main surface by immersing the substrate in an etching solution, and 3) subsequently subjecting the substrate to a precision polishing step. Walker further teaches that the factors affecting etch rate and etch depth, such as etchant concentration, immersion time, and bath temperature, are subject to routine experimentation and optimization

Feng relates common abrasive materials for use in surface precision polishing operations and also teaches process tolerances (e.g. substrate root mean square roughness values (RMS) and substrate material removal depths) which are deemed conventional at the time of the invention. Similarly, Hagihara teaches that the effects of "edge roll-off", (e.g. the "amount of a turned-down edge" of a substrate) was appreciated by practitioners in the art. Hagihara further demonstrates that the claimed "turned-down edge" tolerances would be viewed as merely routine.

### ***Response to Arguments***

Applicant's arguments with respect to claims 7, 8, 12-17, 20-24, and 25 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Lazorcik whose telephone number is (571) 272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLL

  
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